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NAMES AND TYPES IN PERENNIAL *ATRIPLEX* LINNAEUS (CHENOPODIACEAE) IN NORTH AMERICA SELECTIVELY EXCLUSIVE OF MEXICO

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ABSTRACT.—Cited are names and combinations within the woody species of *Atriplex* as they occur in North America. Types and their repositories are included for all taxa except those for which that information could not be located. New nomenclatural proposals include *Atriplex gardneri* var. *aptera* (A. Nelson) Welsh & Crompton, comb. nov.; *A. garrettii* var. *navajoensis* (C. A. Hanson) Welsh & Crompton, comb. nov.; *Atriplex acanthocarpa* var. *coahuilensis* (Henrickson) Welsh & Crompton, comb. nov. A lectotype is designated for *A. breweri* S. Watson.

Key words: Chenopodiaceae, Atriplex *types, North America.*

This list of names and synonyms of perennial and woody *Atriplex* taxa is preliminary to the preparation of a taxonomic treatment for the woody species of *Atriplex* as they occur in North America, both indigenous and introduced species. All names, whether treated as taxa recognized by me or as mere synonyms, are included. The taxonomic treatment that will appear subsequently in the publication of the Flora North America Project will distinguish between the names of taxa per se and their included synonyms. The relatively large number of names and synonyms for this small group of plants is indicative of the changes in generic concepts, the ever-changing interpretation of the status of a taxon, and the general phenotypic plasticity of this amazing group of shrubs, subshrubs, and perennial herbs, which hybridize freely among themselves and sometimes with other taxa not apparently closely allied. They grow on a surprising array of substrates in the American West, from the cold temperate of northern Alberta to the much warmer climates of Mexico. Often they are among the most important shrub species on saline, fine-textured substrates, and sometimes they are the only shrubby inhabitants. Their ability to survive and even thrive in saline sites has placed them in a position of importance for browsing animals where other browse is scarce or lacking. They cover huge areas where geomorphological processes have exposed raw, saline strata in vast expanses. Niobrara Shale, Mancos Shale, Morrison Formation, and numerous other geological formations support these plants. Saline pans and other poorly drained lowlands are occupied by these species. Despite the affinity for saline areas, where they have little competition (except from other halophytes), some of the species thrive where total soluble salts are low. The four-wing saltbush, *Atriplex canescens* (Pursh) Nuttall, is such a plant. It grows from the edge of saline areas up gradient into far less saline substrates, often in grasslands or in shrublands dominated by sagebrush and other shrubby species.

Hybridization is an important factor contributing to the diversity of woody *Atriplex* species. There are at least two main taxa around which many of the remainder are placed, and with which most form at least occasional hybrids, i.e., *A. canescens* (Pursh) Nuttall and *A. confertifolia* (Torrey & Frémont) S. Watson. Some of the hybrids have received names and formal taxonomic recognition. Most of them are of occasional occurrence, and some of the taxa treated in contemporaneous taxonomic works are apparently of hybrid derivation—now more or less stabilized as populations, mainly on very peculiar substrates.

The following list is thought to be exhaustive for woody and perennial *Atriplex* names in North America, especially for those north of Mexico. A few taxa represented in Mexico are included where they round out the names for

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species complexes largely confined north of that country. Pertinent types have been received on loan by the gracious kindness of curators of the herbaria cited with the specimens. Abbreviations for the herbaria are those standard ones cited in Index Herbariorum, except that the origin of the collection is indicated by use of such designations as NY Torrey for historic specimens. This is thought to be important because it authenticates the antiquity of the specimen and might prove important in certain cases in judging whether a particular author had access to a given specimen.

The type information is presented below in dual format for some taxa, with the type locality or collector information (herein arbitrarily designated "Type locality") as recorded with the protologue cited first and with the label data of the type specimen (herein designated "Type") cited second where there is a substantial difference in the two accounts.

Atriplex acanthocarpa **(Torrey) S. Watson,** Proc. Amer. Acad. Arts 9: 117. 1874.

Basionym: *Obione acanthocarpa* Torrey

This is a shrub or subshrub, generally less than 1 m tall, characterized by spongy fruiting bracteoles 8–15 mm long, borne on slender to stout pedicels 4–20 mm long. Leaves are variable, but often sinuate-dentate to undulate-crisped and with hastately lobed base. The species occurs from west Texas and southern New Mexico south to Mexico. It is represented in the United States by two varieties, i.e., var. *acanthocarpa* from western Texas west through southern New Mexico to southeastern Arizona, and var. *coahuilensis* in southern Texas.

Atriplex acanthocarpa **ssp. *coahuilensis* Henrickson,** Southw. Naturalist 33: 458. 1988.

= *A. acanthocarpa* var. *coahuilensis* (Henrickson) Welsh & Crompton (cited below).

Type: Mexico, Coahuila, ca 2 km W of Nadadores in saline pastured flats near El Porvinir along Hwy. 30, with Suaeda, Sporobolus, Distichlis, nar 27°03′ N lat, 101°37′W long, 540 m, 6 Dec 1975, J. Henrickson 14784; holotype TEX; isotypes MEXU, NY!, RSA.

This taxon is distinguished by its fruiting bracteoles bearing radiating processes, and stems with at least the medial leaf blades hastate-lanceolate, and with mature fruiting inflorescences very long. Its range is from southern Texas to southeast Coahuila and coastal Tamaulipas.

Atriplex acanthocarpa **var. *coahuilensis* (Henrickson) Welsh & Crompton,** comb. nov.

Basionym: *A. acanthocarpa* ssp. *coahuilensis* Henrickson, Southwest. Nat. 33: 458. 1988.

Atriplex acanthocarpa **var. *cuneata* (A. Nelson) M. E. Jones,** Contr. West. Bot. 11: 20. 1903.

= *A. gardneri* var. *cuneata* (A. Nelson) Welsh

Atriplex acanthocarpa **var. *pringlei* (Standley) Henrickson,** Southwest. Nat. 33: 461. 1988

Basionym: *A. pringlei* Standley

The taxon is endemic to Mexico, from northern Zacatecas and southern Nuevo Leon south to San Luis Potosi.

Atriplex acanthocarpa **ssp. *stewartii* (I. M. Johnston) Henrickson,** Southwest. Nat. 33: 457. 1988.

Basionym: *A. stewartii* I. M. Johnston

The taxon is endemic to Coahuila, Mexico, and is distinguished by its 4-winged fruiting bracteoles, although specimens are transitional to *A. acanthocarpa* var. *acanthocarpa*.

Atriplex amnicola **P. G. Wilson,** Flora of Australia 4: 322. 1984.

Type: "Yalgoo, W. A." [western Australia], 10 Oct. 1945, C. A. Gardner 7751a; holotype PERTH!

Atriplex angustior **Cockerell,** Proc. Davenport Acad. Nat. Sci. 9: 7. 1902.

= *A. canescens* (Pursh) Nuttall

Type: New Mexico, Dona Ana Co., Mesilla Park, Cockerell in 1900; holotype US!

The US specimen bears the following label data: "Atriplex angustior, n. sp. Distinguished from A. canescens by the very narrow (3 mm broad) leaves. Apparently = A. canescens angustifolia but that name is preoccupied. Sand Hills Mesilla Park, N. M. 1900. T.D.A. Cockerell."

Hall and Clements (1923) cited this as a new name for *A. canescens* var. *angustifolia*, but it seems obvious that while Cockerell recognized the equivalency of the taxa, he was proposing a new taxon, not merely a new name.

Atriplex aptera **A. Nelson,** Bot. Gaz. 34: 356. 1902.

= *A. gardneri* var. *aptera* (A. Nelson) Welsh & Crompton

Type locality: Wyoming, Laramie, Sept. 1901, E. Nelson 738; A. Nelson (1902).

Type: "*Atriplex aptera* A. Nels. n. sp. Moist saline soil. Laramie, Albany Co., Wyoming. Sept. 1901. Elias Nelson No. 738"; holotype RM!; isotype GH!, UC (frag.)!

Hanson (1962) suggested that his taxon was of hybrid derivation involving *A. canescens* and *A. buxifolia* as parental taxa. Distribution of specimens assignable to the concept is sporadic, possibly indicating multiple origins, and it cannot be considered a taxon in the usual sense. The type specimen of *A. aptera* has definite wings aligned in four rows similar to some *A. canescens* but agrees in aspect, size, and general features with *A. gardneri*.

Atriplex berlandieri **Moquin-Tandon,** Chenop. Enum. 65. 1840.

= *A. canescens* (Pursh) Nuttall

Type: "In regno Mexicano. Berlandier 1828"; holotype ?

Moquin-Tandon enlarges on the type information in his treatment in Prodromus (13[2]: 114. 1849), "In regno Mexicano inter Laverdo et Bejar (Berland.! n. 1450)."

Atriplex bonnevillensis **C. A. Hanson,** Stud. Syst. Bot. Brigham Young Univ. 1: 2. 1962.

= *A. gardneri* var. *bonnevillensis* (C. A. Hanson) Welsh

Type: Utah, Millard Co., "dry lake bed 1.5 miles northeast of headquarters, Desert Range Experiment Station (dominant plant)," 12 July 1961, C. A. Hanson 354; holotype BRY!; isotypes GH!, MO!, NY!, UTC!

The sheets at GH and NY have the date printed as 13 July 1961, probably representing typographical errors.

Atriplex breweri **S. Watson,** Proc. Amer. Acad. Arts 9: 119. 1874.

Type locality: "Frémont; 459 Torrey; 75 Brewer" (l.c.).

Paratypes: "Frémont's 2nd Expedn. Atriplex Breweri S. Wats."; NY Torrey!; "No. 459. Santa Barbara County, California. J. Torrey, 1865"; NY! and NY LeRoy!, GH!

Type: "Geological Survey of California, 1863. Coll. H. Brewer. No. 75. Atriplex Breweri n. sp. Sea Shore—Sta Monica. 6"[ft] high or more"; lectotype GH!, here designated; isolectotypes NY!, UC, US!

Since the plant was described by Watson on the basis of at least three collections, and as there are duplicates of the Brewer collection, it is proper to designate the material at GH as lectotype. The sheet at US bears a sketch and notes by John Torrey: "75. Obione—near the Sea, at Sta Monica: Probably O. lentiformis (large fruited) in an abnormal state. The bracts appear to have been changed by galls."

Recognition of *A. breweri* at taxonomic level as either a variety or subspecies of *A. lentiformis* is not without merit. Indeed, the plants have typically larger leaves and fruiting bracteoles that average larger. However, there is a series of intermediates that connect the robust coastal material with the less robust plants in the interior. Plants designated as belonging to *A. breweri* are considered by me as taxonomically negligible.

Atriplex buxifolia **Rydberg,** Bull. Torrey Bot. Club 39: 311. 1912.

= *A. gardneri* var. *aptera* (A. Nelson) Welsh

Type locality: Wyoming, Sheridan Co., Dayton, 1220 m altitude, September 1899, Tweedy 2456; holotype NY!

Type: "F. Tweedy 2656 (2456 in publication), Dayton, 4000 ft, Sheridan Co., Wyoming, September 1899"; lectotype NY! (Basset et al. Genus *Atriplex* in Canada 58. 1983).

Atriplex canescens **(Pursh) Nuttall,** Genera N. Amer. Pl. 1: 197. 1818.

Basionym: *Calligonum canescens* Pursh

Putative or actual hybrids are known between *A. canescens* and *A. confertifolia* or *A. gardneri* (various varieties). Such hybrids are only occasional; they do not swamp the characteristics of the taxa nor persist as populations. The two exceptions to the sporadic nature of the hybrids involving *A. canescens* as one of the parental types are *A. gardneri* var. *bonnevillensis* and *A. gardneri* var. *aptera*. Neither of these overwhelms the parental taxa, but being long-lived, they persist for long periods of time and occupy rather large areas in specific habitats. Bracts with four wings appear to have arisen independently at several places within the woody atriplexes. Such a condition is not necessarily an indication of close genetic affinities. Indeed, the *garrettii* and *acanthocarpa* complexes seem to be more distantly removed from *A. canescens* than from other taxa.

Atriplex canescens var. *angustifolia* **(Torrey) S. Watson,** Proc. Amer. Acad. Arts 9: 121. 1874.

= *A. canescens* (Pursh) Nuttall

Basionym: *Obione occidentale* var. *angustifolia* Torrey

Narrow-leaved shrubs from west Texas are transitional with broader-leaved materials both there and elsewhere. They do not seem to constitute a taxon.

Atriplex canescens ssp. *aptera* **(A. Nelson) Hall & Clements,** Publ. Carnegie Inst. Wash. 326: 343, pl. 58. 1923.

Basionym: *A. aptera* A. Nelson

= *A. gardneri* var. *aptera* (A. Nelson) Welsh

Atriplex canescens var. *aptera* **(A. Nelson) C. L. Hitchc.,** Vasc. Pls. Pacif. NW. 2: 186. 1964.

Basionym: *A. aptera* A. Nelson

= *A. gardneri* var. *aptera* (A. Nelson) Welsh

Atriplex canescens ssp. *garrettii* **(Rydberg) Hall & Clements,** Publ. Carnegie Inst. Wash. 326: 344. 1923.

Basionym: *A. garrettii* Rydberg

Atriplex canescens var. *garrettii* **(Rydberg) Benson,** Amer. J. Bot. 30: 236. 1943.

Basionym: *A. garrettii* Rydberg

Atriplex canescens var. *gigantea* **Welsh & Stutz,** Great Basin Nat. 44: 189. 1984.

Type: Utah, Juab Co., Lynndyl sand dunes, T35S, R4W, 8 Sept. 1965, S. L. Welsh & G. Moore 5126; holotype BRY!; isotype NY!

The variety is based on its very broad bracts, stems that produce roots by layering, thus accommodating burial in dunes, and diploid chromosome number.

Atriplex canescens var. *laciniata* **Parish,** in Jepson, Fl. Calif. 442. 1914.

= *A. canescens* × *A. polycarpa*? as to possible origin.

Type locality: California, Imperial Co., "Caleb, Colorado Desert, Parish 8256" (Jepson l.c.).

Type: California, Imperial Co., "Plants of Southern California, Salton Basin, Caleb. About 200 feet below sea level. No. 8256. Coll. S. B. Parish. Oct 11. 1911"; holotype UC JEPS!; isotype GH!

This variety has been suggested as based on specimens intermediate between *A. canescens* and *A. linearis* (C. A. Hanson l.c.), although Stutz (personal communication 1994) poses quite another possibility, i.e., that a chromosomal race of *A. polycarpa* forming hybrids with *A. canescens* has resulted in at least partially stabilized populations of var. *laciniata* within the Salton Basin. The type is characterized by deeply laciniate, 4-lobed bracteoles within the size range of *A. canescens*. It has slender branchlets and narrow leaves approaching those of both *A. linearis* and *A. canescens* var. *macilenta*, which had a similar origin from a separate chromosomal race of *A. polycarpa* forming hybrids with *A. canescens*.

Atriplex canescens ssp. *linearis* **(S. Watson) Hall & Clements,** Publ. Carnegie Inst. Wash. 326: 344, pl. 58. 1923.

Basionym: *A. linearis* S. Watson

= *A. linearis* S. Watson

Atriplex canescens var. *linearis* **(S. Watson) Munz,** Manual S. Calif. Bot. 141. 1935.

Basionym: *A. linearis* S. Watson

= *A. linearis* S. Watson

Atriplex canescens ssp. *macropoda* **(Rose & Standley) Hall & Clements,** Phylog. Meth. Taxon 344. 1923.

Basionym: *A. macropoda* Rose & Standley

This taxon is known from Baja California.

Atriplex canescens var. *macilenta* **Jepson,** Fl. Calif. 1: 442. 1914.

Type locality: California, Imperial Co., "Holtville, Colorado Desert, Parish 8258" (l.c.).

Type: California, Imperial Co., "Plants of Southern California. Salton Basin. Bluffs of Alamo River, Hallbartle. About 15 feet below Sea Level, S. B. Parish 8258, Oct. 18, 1912"; holotype UC JEPS!; isotypes DS ("Calexico"), GH!, POM!

The type has leaves to 4 mm wide, narrowly oblanceolate and obtuse apically. Bracts are small, as in *A. lincaris*, and toothed along the margin of the wings. The toothed margin of the wings hints at the laciniate nature of bracts on plants from the nearby Salton Basin and named var. *laciniata* Parish. Plants called var. *macilenta* approach but do not exactly match the more characteristic specimens of *A. lincaris* from southern Arizona and northern Mexico. According to Stutz (personal communication 1994), the var. *macilenta* is a high polyploid, while *A. lincaris* is a diploid. The relatively broader, thicker leaves of var. *macilenta* are apparently diagnostic.

The specimen at DS, Parish 8258, Oct. 1912, is labeled as having been taken on "Bluffs of the Alamo, Calexico." It is one of three localities cited under Parish's number 8253, and the specimens other than the one taken at Holtville are probably best considered as paratypes.

Parish made a series of collections from the Salton Basin in October 1912. His numbers 8255 and 8256 were collected on October 11; 8255 is a small-bracteoled, narrow-leaved plant assignable to var. *macilenta*, the type of which (8258) was taken on 18 October. Parish's number 8256, the type of var. *laciniata*, is evidently closely placed geographically within the Salton Basin, which also supports *A. polycarpa*, which is potentially involved in the origin of both vars. *macilenta* and *laciniata* through hybridization with different chromosome races of *A. polycarpa* through hybridization with *A. canescens*. Number 8255 approaches *A. lincaris* in size of bracts and width of leaves, and possibly that species is also involved in the derivation of both vars. *laciniata* and *macilenta*.

***Atriplex canescens* var. *occidentale* (Torrey & Frémont) Welsh & Stutz**, Great Basin Nat. 44: 188. 1984.

Basionym: *Pterochiton occidentale* Torrey & Frémont

= *A. canescens* (Pursh) Nuttall var. *canescens*

This name was resurrected on false supposition that the type of *A. canescens* sensu stricto differed from the tall phases of the plant so widely distributed in the American West. It is an unfortunate later synonym.

***Atriplex collina* Wooton & Standley**, Contr. U.S. Natl. Herb. 16: 119. 1913.

= *A. confertifolia* (Torrey & Frémont) S. Watson

Type: Arizona, Apache Co., "dry hills near the north end of the Carrizo Mountains," P. C. Standley 7481, 31 July 1911; holotype US!

***Atriplex confertifolia* (Torrey & Frémont) S. Watson**, Proc. Amer. Acad. Arts 9: 119. 1874.

Basionym: *Obione confertifolia* Torrey & Frémont, in Frémont

***Atriplex corrugata* S. Watson**, Bot. Gaz. 16: 341. 1891.

Type locality: "Nearly allied to *A. nuttallii*. Discovered by Miss Alice Eastwood at Grand Junction, Colorado, in well formed fruit on 20th May, 1891. Miss Eastwood notes it as the earliest in fruit of several perennial species of the genus growing in the same locality" (l.c.).

Type: "Atriplex corrugata Watson, n. sp. Grand Junction, Colorado. Miss Alice Eastwood—May 20/1891"; holotype GH!; isotypes UC (fragments taken from holotype by H. M. Hall)!, K, MO, US!

The type consists of two fertile branches, one pistillate and the other staminate. Both have the small, narrow leaves characteristic of the taxon throughout its rather small range. The species is almost exclusively restricted to saline substrates of such fine-textured strata as the members of the Cretaceous Mancos Shale and Jurassic Morrison Formation, inter alia, where it often occurs as a monotype. It forms occasional hybrids with *A. confertifolia* and *A. gardneri* var. *cuneata*, with whom its ecology is sporadic. The taxon is probably most closely allied to the latter, with which it shares large land areas, but from which its autecology is restricted. It is regarded herein at species rank because of the maintenance of morphological integrity despite occasional contact with the other taxa over much of its area. Additionally, there are hints in its morphology of close ties in still another direction, i.e., with *A. obovata*.

***Atriplex cuneata* A. Nelson**, Bot. Gaz. 34: 357. 1902.

= *A. gardneri* var. *cuneata* (A. Nelson) Welsh

Type locality: "M. E. Jones 5443, Emery, Utah, 1894," Nelson (1902).

Type: M. E. Jones 5443, Emery, 7000 ft., Emery Co., Utah, 16 June 1894; holotype RM!; isotypes MO!, NY! (3 sheets), US!

***Atriplex cuneata* ssp. *introgressa* C. A. Hanson**, Stud. Syst. Bot. Brigham Young Univ. 1: 4. 1962.

= *A. gardneri* var. *cuneata* × var. *tridentata*

Type: Utah, Carbon Co., "Wellington, ca 0.1 mi S of Price River, in clay hills along road leading to city dump," 9 July 1961, Hanson 346; holotype BRY!; isotypes GH!, POM!

The specimens on which this taxon are based demonstrate intermediacy between the *cuneata* and *tridentata* phases of *A. gardneri*. Their recognition at any taxonomic level is problematical.

***Atriplex curvidens* T. S. Brandegee**, Proc. Calif. Acad. Sci. II, 2: 201. 1889.

= *A. polycarpa* (Torrey) Watson

Type: Baja California, Comondu, four feet high, rounded April 24, 1889, Brandegee sn; holotype UC!

***Atriplex decumbens* S. Watson**, Proc. Amer. Acad. Arts 12: 275. 1877.

= *A. watsonii* A. Nelson.

Type locality: California, "Near San Diego; Dr. E. Palmer, 1875 (n. 334)" (Watson 1877).

Type: "Southern part of San Diego Co., California. Coll. Edward Palmer, M.D., 1875. No. 334. Atriplex decumbens, Watson n. sp. San Diego"; holotype GH!; isotype NY! (2 sheets).

The type consists of a small and a large branch, both staminate. The large branch is evidently from a sprawling herbaceous perennial. Leaves are mostly opposite, becoming subopposite above, elliptic to ovate-lanceolate, obtuse to rounded apically; the glomerules are 3–5 mm thick and are arranged in terminal spikes 1–4 cm long.

***Atriplex eremicola* Osterhout**, Bull. Torrey Bot. Club 25: 284. 1898a. nom. nov.

Basionym: *A. fruticulosa* Osterhout.

= *A. gardneri* (Moqnin-Tandon) Dietrich var. *gardneri*

Atriplex falcata (M. E. Jones) Standley, N. Amer. Fl. 21: 68. 1916.

Basionym: *A. nuttallii* var. *falcata* M. E. Jones, Contr. W. Bot. 11: 19. 1903.

= *A. gardneri* var. *falcata* (M. E. Jones) Welsh

Atriplex fruticosa Nuttall ex Moquin-Tandon, in de Candolle, Prodr. 13(2): 112. 1849. pro syn.

= *A. gardneri* var. *gardneri*

Type: "*Atriplex* * *fruticosa*. A. Halimum affinis. R. Mts." Nuttall; holotype BM!

The type of *A. fruticosa* is mounted with collections with the notation "British North America. Dr. Richardson 1819–28," and designated as *A. canescens*. In Index Kewensis the name *fruticosa* is noted as a synonym of *A. canescens*, a supposition possibly based on the identity of the Richardson material, but more probably on the publication of the name as a synonym of *A. canescens* by Moquin-Tandon. The epithets *fruticosa* and *heterophylla*, both herbarium names of Nuttall, were published as synonyms and are not to be regarded in considerations of priority.

Atriplex fruticulosa Jepson, Pittonia 2: 306. 1892.

Type: California, "Little Oak, Solano Co., Aug. 16, 1892. Willis L. Jepson"; holotype UC!; isotype MO!

This plant functions mostly as an annual but is apparently capable of a longer life span, extending to become a short-lived perennial. The name has priority over the later homonym, *A. fruticulosa* Osterhout (1898).

Atriplex fruticulosa Osterhout, Bull. Torrey Bot. Club 25: 207. 1898. non *A. fruticulosa* Jepson 1892.

Basionym for: *A. eremicola* Osterhout

= *A. gardneri* (Moquin-Tandon) Dietrich var. *gardneri*

Type locality: Wyoming, Albany Co., Steamboat Lake, "The type was collected near a small alkaline lake in Southern Wyoming," G. Osterhout s.n. 2 July 1896; holotype (no. 1324) RM!; isotype NY!, RM! (this second sheet, presumably an isotype, lacks the collector's number). A collector's number was not cited with the protologue, but the holotype sheet at RM bears the number 1324. Material on which this entity was based differs in no particular way from *A. gardneri* var. *gardneri*.

Atriplex gardneri (Moquin-Tandon) Dietrich, Syn. Pl. 5: 537. 1852.

Basionym: *Obione gardneri* Moquin-Tandon

There is a sheet, possibly identifiable as belonging to this species and not bearing on the nomenclature of the species, in the Lewis and Clark herbarium at PH: "A half shrub from the high plains of Missouri. July 20th 1806." It is cited here to demonstrate that the species was known from the earliest collections into the western plains.

Atriplex gardneri var. *aptera* (A. Nelson) Welsh & Crompton, comb. nov.

Basionym: *Atriplex aptera* A. Nelson, Bot. Gaz. 34: 356. 1902.

This entity was treated by Hanson (1962) as a probable derivative of hybridization between *A. canescens* and *A. buxifolia* (*A. gardneri* sens. lat.). It is a low subshrub most similar to the latter, but with bracteoles winged as in *A. canescens* or with tubercles aligned in four rows, and with yellow staminate flowers. It is likely that the condition of 4-winged fruits has arisen independently on many occasions and that the resulting populations are not associated genetically as in a typical taxon. Regardless of origin, however, the resultant plants are readily recognizable and are widely distributed from southern Canada south along the plains to Nebraska and Wyoming. *A. canescens* also forms hybrids with other phases of the *gardneri* complex (see below).

Atriplex gardneri var. *bonnevillensis* (C. A. Hanson) Welsh, Great Basin Nat. 44: 190. 1984.

Basionym: *A. bonnevillensis* C. A. Hanson

This variety is more or less intermediate between *A. gardneri* var. *falcata* and *A. canescens*, but it most nearly resembles the former in habit. The bracteoles are 5–8 mm long and 3–9 mm wide, ovoid, with four lateral wings or rows of flattened tubercules to 3 mm wide, or the wings rarely absent. The plants are confined to playas and saline pans in the valleys of western Utah and across Nevada.

Atriplex gardneri var. *cuneata* (A. Nelson) Welsh, Great Basin Nat. 44: 191. 1984.

Basionym: *A. cuneata* A. Nelson

Atriplex gardneri var. *falcata* (M. E. Jones) Welsh, Great Basin Nat. 44: 191. 1984.

Basionym: *A. nuttallii* var. *falcata* M. E. Jones

Atriplex gardneri var. *tridentata* (Kuntze) Macbride, Contr. Gray Herb. 3: 11. 1918.

= *A. gardneri* var. *utahensis* (M. E. Jones) Dorn

Basionym: *A. tridentata* Kuntze

Atriplex gardneri var. *welshii* (C. A. Hanson) Welsh, Great Basin Nat. 44: 191. 1984.

Basionym: *A. welshii* C. A. Hanson

Atriplex gardneri var. *utahensis* (M. E. Jones) Dorn, Vasc. Pl. Wyo. 130. 1988.

Basionym: *A. nuttallii* var. *utahensis* M. E. Jones

Atriplex garrettii Rydberg, Bull. Torrey Bot. Club 39: 312. 1912.

Type: Utah, Grand Co., "Vicinity of Moab," July 1–2, 1911, P. A. Rydberg & A. O. Garrett 8465; holotype NY!; isotypes GH!, US!, UT!

Despite earlier treatments in which this taxon was regarded at infraspecific status within *A. canescens*, the nearest allies appear to be in the *gardneri* complex. Apparent hybrids are known between *A. garrettii* and *A. confertifolia* (C. A. Hanson 1962), but not with *A. canescens*.

Atriplex garrettii var. *navajoensis* (C. A. Hanson) Welsh & Crompton, comb. nov.

Basionym: *A. navajoensis* C. A. Hanson, Stud. Syst. Bot. Brigham Young Univ. 1: 3. 1962.

This variety differs from the type material in plant size, length of staminate inflorescences, color of staminate flowers, and other intangibles. Generally the plants are very similar. The few known localities, from the vicinity of Lee's Ferry to Navajo Bridge in Coconino County, AZ, are only disjunct by about 100 km from the nearest populations of var. *garrettii*.

Atriplex gordoni Hooker, J. Bot. 5: 261. 1853. nom. nov. pro *A. gardneri* Moquin-Tandon.

= *A. gardneri* (Moquin-Tandon) Dietrich var. *gardneri*

Atriplex greggii S. Watson, Proc. Amer. Acad. Arts 9: 118. 1874.

= *A. obovata* Moquin-Tandon

Type locality: "New Mexico to Sonora. Collectors:—1346 Berlandier; 462 Gregg; Emory; Thurber; Bigelow; 572, 1137, 1138 Wright" (Watson l.c.).

Paratypes: "No. 462. Atriplex obovata Moq. Perros Bravos, Coahuila, Mexico, Dr. J. Gregg, leg. 1848–49" (GH Lowell!); "Berlandier, No. 1346. Bae de del Salad, San Luis Potosi, 1827" (GH!).

Type: "462. Atriplex. *Perros Bravos*, north of Saltillo. 1 ft. tall. Abundant. *State of Coahuila*, Mexico. Dr. J. Gregg, leg. Sept. 20, 1848"; lectotype GH! (I. M. Johnston, J. Arnold Arb. 25(2): 147. 1944); isolectotype GH Lowell!

Atriplex griffithsii **Standley,** N. Amer. Fl. 21: 63. 1916.

= *A. lentiformis* var. *griffithsii* (Standley) L. Benson

Type: Arizona, Cochise Co.: "Wilcox," Griffiths sn. 1895, Oct. 12, 1900; holotype NY!; isotype US!

This is a distinctive taxon with silvery, thick leaves. It is disjunct from the remainder of the species.

Atriplex heterophylla **Nuttall ex Moquin-Tandon,** in de Candolle, Prodr. 13(2): 112. 1849. pro syn.

= *A. gardneri* (Moquin-Tandon) Dietrich var. *gardneri*

Type: "Atriplex * *heterophylla*. R. Mts." Nuttall; intended type BM!

This is yet another herbarium name by Nuttall cited as a synonym of *A. canescens* by Moquin-Tandon in de Candolle's Prodromus. It again demonstrates that the species was well represented in collections prior to the collection of the type material of *A. gardneri*.

Atriplex hymenelytra **(Torrey) S. Watson,** Proc. Amer. Acad. Arts 9: 119. 1874.

Basionym: *Obione hymenelytra* Torrey

Atriplex johnstonii **C. B. Wolf,** Occas. Pap. Rancho Santa Ana Bot. Gard. 1: 3. 1935.

= *A. nummularia* Lindl.

Type: California, Los Angeles County, Coastal cliffs, Playa del Rey. C. B. Wolf 1821, 23 Dec. 1930; isotypes CAS!, GH!, NY!

The isotype at GH consists of four woody, leafy branches, two of them with fruiting bracts. Leaves are short-petiolate, with blades 1.2–3.5 cm long and 1–3 cm wide.

Atriplex jonesii **Standley,** N. Amer. Fl. 21: 65. 1916. nom. nov. pro *A. sabulosa* M. E. Jones.

= *A. obovata* Moquin-Tandon

Atriplex lentiformis **(Torrey) S. Watson,** Proc. Amer. Acad. Arts 9: 118. 1874.

Basionym: *Obione lentiformis* Torrey, in Sitgreaves

This is a warm-desert species, important in saline pans along drainages at low elevations in the valleys of the Colorado and Gila rivers and Salton Sink. The species is distributed from western and southern Arizona, through southern Nevada and California, and also in Mexico. Hanson (1962) notes that *A. lentiformis* sens. lat. forms hybrids with *A. leucophylla* (Moquin-Tandon) Dietrich, a perennial not especially woody species, and possibly even with an annual species. Such hybridizations might indicate that *A. lentiformis* and its near relative *A. torreyi* have alliances elsewhere than with the other woody species treated herein.

Atriplex lentiformis **ssp. *breweri*** **(S. Watson) Hall & Clements,** Publ. Carnegie Inst. Wash. 326: 335, pl. 54. 1923.

Basionym: *A. breweri* S. Watson

= *A. lentiformis* sens lat?

Atriplex lentiformis **var. *breweri*** **(S. Watson) McMinn,** Man. Calif. Shrubs 113. 1939.

Basionym: *A. breweri* S. Watson

= *A. lentiformis* sens lat?

Atriplex lentiformis **ssp. *griffithsii*** **(Standley) Hall & Clements,** Publ. Carnegie Inst. Wash. 326: 336, pl. 55. 1923.

Basionym: *A. griffithsii* Standley

= *A. lentiformis* sens. lat?

Atriplex lentiformis **var. *griffithsii*** **(Standley) Benson,** Amer. J. Bot. 30: 236. 1943.

Basionym: *A. griffithsii* Standley

= *A. lentiformis* sens. lat?

Atriplex lentiformis **ssp. *torreyi*** **(S. Watson) Hall & Clements,** Publ. Carnegie Inst. Wash. 326: 335. 1923.

Basionym: *Obione torreyi* S. Watson

Atriplex lentiformis **var. *torreyi*** **(S. Watson) McMinn,** Man. Calif. Shrubs 113. 1939.

Basionym: *Obione torreyi* S. Watson

Atriplex linearis **S. Watson,** Proc. Amer. Acad. Arts 24: 72. 1889.

Type locality: Mexico, Sonora, alkaline soil about Guaymas, Palmer 120, 121, 235; syntypes GH.

Paratypes: "Flora of Guaymas, Mex. Dr. Edward Palmer, 1887. No. 120. Atriplex linearis Watson, n. sp. Garden fences in alkaline soil. July"; GH! and "Flora of Guaymas, Mex. Dr. Edward Palmer, 1887. No. 121. Atriplex Linearis, Watson, n. sp. Garden fences, alkaline soil. July"; GH!

Type: "Flora of Guaymas, Mex. Dr. Edward Palmer, 1887. No. 235. Atriplex linearis Watson, n. sp. Plains in alkaline soil. Sept."; lectotype GH! (G. D. Brown, Amer. Midl. Nat. 55: 210. 1956).

Paratypes 120 and 121 are immature, the former pistillate, the latter staminate. The lectotype sheet #235 has at least four branches with more or less mature fruiting bracteoles. The bracteoles are 4-winged, rather deeply laciniately lobed to merely toothed along the wings, and are 3–6 mm wide.

Hanson (1962) regarded *A. linearis* as the most substantial variant within the *canescens* complex but recognized that it forms hybrids with *A. canescens*. The plants are certainly morphologically distinct from most phases of that entity. The slender, short to elongate leaves (seldom more than 4 mm wide and to 3.8 cm long), fruiting bractoles seldom over 6 or 7 mm wide, and very slender branchlets are apparently diagnostic in most instances.

Atriplex macropoda **Rose & Standley,** N. Amer. Fl. 21: 72. 1916.

= *A. linearis* S. Watson (sens lat?, but the fruiting bracteoles are long pedicellate, unlike *A. canescens*)

Type locality: "Type collected on Pinchillinque Island, Lower California, March 27, 1911, J. N. Rose 16518 (U.S. Nat. Herb. no. 638567)."

Type: Lower California, Pinchilinque Island, Gulf of California, J. N. Rose 16518, March 27, 1911; holotype US!

Atriplex matamorensis **A. Nelson,** Proc. Biol. Soc. Wash. 17: 99. 1904.

Nom. nov. pro. *A. oppositifolia* S. Watson

Atriplex navajoensis **C. A. Hanson,** Stud. Syst. Bot. Brigham Young Univ. 1: 3. 1962.

= *A. garrettii* var. *navajoensis* (C. A. Hanson) Welsh & Crompton

Type: "Arizona: Coconino Co., east side of the Navajo Bridge, July 21, 1961," C. A. Hanson 388; holotype BRY!; isotype GH!

Atriplex* × *neomexicana **Standley,** N. Amer. Fl. 21: 67. 1916.

= *A. gardneri* var. *cuneata* × *A. confertifolia*

Type locality: "Type collected on dry hills near Farmington, New Mexico, altitude 1550–1650 m, July 19, 1911, Paul C. Standley 7066 (U.S. Nat. Herb. no. 686089)."

Type: New Mexico, "Dry hills near Farmington," San Juan Co., New Mexico, July 19, 1911, P. C. Standley 7066; holotype US!

The name is evidently based on plants intermediate between *A. gardneri* var. *cuneata* and *A. confertifolia.*

Atriplex nummularia **Lindley,** Mitch. J. Exped. Trop. Australia 64. 1848.

Type: Australia, "Cultivated in Italy, seed from South Australia"; holotype not seen.

Atriplex nuttallii **S. Watson,** Proc. Amer. Acad. Arts 9: 116. 1874. nom. nov.

= *A. canescens* (Pursh) Nuttall sens. str.

It is unfortunate that one must at this late date attempt to analyze Watson's use of the name *nuttallii* for a portion of the woody atriplexes in the American West. From its publication in 1874 the name has been the source of much confusion, serving to clutter *Atriplex* nomenclature for all subsequent time. It seems certain from a study of Watson's proposal, justification for which can only be inferred, that he was merely presenting a new name for material that he thought to be misinterpreted by contemporary botanists. The evolution of botanical thought with regard to the perennial atriplex species parallels that for other newly discovered taxa in the American West and was initiated when the first of the woody specimens arrived from western botanical explorers. Few names were available, specimens were few and often fragmentary, literature was difficult to obtain, and it was easy to misapply concepts and mix names, a symptomology not of that era alone.

Supposed sensu names cited by Watson (1874) within the synonymy of *A. nuttallii* include *Atriplex canescens* as used by Nuttall and an assortment of other historical authors, *Obione canescens* of Moquin-Tandon and other authors, and still another synonym, i.e., "*A. gordonii* Hook.," with the citation "Pl. Geyer in Lond. Jour. Bot. 5: 261?," and by implication the type of *A. gordonii* (i.e., *A. gardneri*).

Watson first cited the name *A. canescens* as published by Nuttall (1818), the implication being that *Calligonum canescens* Pursh, basionym of *A. canescens,* could not apply. Nuttall is indeed author of the combination *Atriplex canescens,* and the place of citation is his 1818 publication, wherein he cites *C. canescens* as the basionym of his combination; furthermore, Nuttall's description is clearly *C. canescens* Pursh, sensu stricto. It is Watson's understanding of Nuttall's use of the epithet that is in error. Thus, *A. canescens* of Nuttall is certainly not a mere sensu name, however one might wish to interpret the application of the epithet. Both the name and the concept as supplied by Nuttall are *A. canescens,* including its basionym. *A. nuttallii* of Watson thus includes the type of *Calligonum canescens,* and the epithet *nuttallii* is illegitimate under stipulations of the International Code. Hence, from a nomenclatural viewpoint there is no problem. Nuttall based his *Atriplex canescens* squarely on *Calligonum canescens* Pursh, and Watson quoted *A. canescens* Nuttall as the name-bringing synonym of *A. nuttallii,* which was stillborn. The lectotype of *Caligonum canescens* Pursh is at PH and is therefore the lectotype of both *Obione canescens* and *A. nuttallii,* which cannot be transferred to a different species or brought to life by sophisticated arguments. Hence, the proposal for lectotypification by McNeill et al. (1983) is illegitimate.

Atriplex nuttallii **var. *anomala*** **M. E. Jones,** Contr. W. Bot. 11: 19. 1903.

= *A. gardneri* var. *falcata* (M. E. Jones) Welsh

Type locality: "The type is my specimens from Dolly Varden Smelter, E. Nevada, July 1894 [1891]."

Type: Nevada, Elko Co., "Marcus E. Jones Herbarium. Atriplex nuttallii var. anomata [sic] Jones n. var. Dolly Varden at the Smelter, VII-24-91. N.W. of Ibapah, Utah." M. E. Jones sn; holotype POM!; isotype UC (frag.)!

Jones was clearly in error in citing the date of the collection as 1894. His itinerary cited in Leaflets of Western Botany (10: 189–236) places him at the Dolly Varden Smelter on 24 July 1891, not 1894.

Atriplex nuttallii **ssp. *buxifolia*** **(Rydberg) Hall & Clements,** Phylog. Meth. Taxon. 325. 1923.

Basionym: *A. buxifolia* Rydberg

= *A. gardneri* (Moquin-Tandon) Dietrich var. *gardneri*

Atriplex nuttallii corrugata **(S. Watson) A. Nelson,** in Coulter & Nelson, New. Man. Bot. Rocky Mts. 168. 1909.

= *A. corrugata* S. Watson

Atriplex nuttallii **ssp. *cuneata*** **(A. Nelson) Hall & Clements,** Publ. Carnegie Inst. Wash. 326: 324, f. 45. 1923.

Basionym: *A. cuneata* A. Nelson

= *A. gardneri* var. *cuneata* (A. Nelson) Welsh

Atriplex nuttallii **ssp. *falcata*** **(M. E. Jones) Hall & Clements,** Publ. Carnegie Inst. Wash. 326: 324. f. 45. 1923.

Basionym: *A. nuttallii* var. *falcata* M. E. Jones

= *A. gardneri* var. *falcata* (M. E. Jones) Welsh

Atriplex nuttallii **var. *falcata*** **M. E. Jones,** Contr. W. Bot. 11: 19. 1903.

= *A. gardneri* var. *falcata* (M. E. Jones) Welsh

Type locality: "Weiser, Idaho, July, 1899, Jones" (l.c.).

Type: Idaho, Washington Co., "Flora of Idaho. Type material. Atriplex nuttallii var. falcata Jones n. var. Weiser, Wash. Co. July 7 1899. Alt. 2200 Ft." M. E. Jones sn; holotype POM!; isotype UC!

Atriplex nuttallii **ssp. *gardneri*** **(Moquin-Tandon) Hall & Clements,** Publ. Carnegie Inst. Wash. 326: 324. 1923.

= *A. gardneri* (Moquin-Tandon) Dietrich var. *gardneri*

Basionym: *Obione gardneri* Moquin-Tandon

Atriplex nuttallii **ssp. *tridentata*** **(Kuntze) Hall & Clements,** Publ. Carnegie Inst. Wash. 326: 324. 1923.

= *A. gardneri* var. *utahensis* (M. E. Jones) Dorn

Basionym: *A. tridentata* Kuntze

Atriplex nuttallii **var. *gardneri*** **(Moquin-Tandon) R. J. Davis,** Fl. Idaho. 261. 1952.

= *A. gardneri* (Moquin-Tandon) Dietrich var. *gardneri*
Basionym: *Obione gardneri* Moquin-Tandon

***Atriplex nuttallii* var. *tridentata* (Kuntze) R. J. Davis**, Fl. Idaho 261. 1952.
= *A. gardneri* var. *utahensis* (M. E. Jones) Dorn
Basionym: *A. tridentata* Kuntze

***Atriplex nuttallii* var. *utahensis* M. E. Jones**, Contr. W. Bot. 11: 19. 1903.
= *A. gardneri* var. *utahensis* (M. E. Jones) Dorn
Type locality: "This is No. 1760 Jones from Salt Lake City, and is the more common form in Utah."
Type: Utah, Salt Lake City, Salt Lake Co., M. E. Jones 1760, 16 June 1894; holotype POM?; isotype UC (frag.)!

***Atriplex oblanceolata* Rydberg**, Bull. Torrey Bot. Club 31: 403. 1904.
= *A. gardneri* var. *cuneata* (A. Nelson) Welsh
Type locality: Colorado, Delta Co., Delta, Cowen 4071 (Rydberg 1904).
Type: "Plants of Colorado. No. 4071. Atriplex oblanceolata Rydb. Delta, J. H. Cowen. Sept 3, 1897"; holotype NY!; isotypes GH!, RM! (2 sheets), US!

***Atriplex obovata* Moquin-Tandon**, Chenop. Enum. 61. 1840.
Type locality: "In Peruvia. (v. s. in herb. Mus. Paris)" (l.c.).
Type: "No. 1346. Bae del Salad, Saint Louis Potosi. Dbre. 1827," and "Herbarium Berlandierianum Texano-mexicanum. No. 1346. Atriplex obovata, Moq.! O. canescens, var? Torr. San Luis Potosi; Mexico, State of San Luis Potosi, Berlandier 1346"; lectotype P? (I. M. Johnston, J. Arnold Arbor. 25[2]: 148. 1944); isolectotype GH!
The isolectotype sheet at GH consists of three leafy branches, now lacking fruiting bracteoles or staminate flowers. The material is certainly a match for what has traditionally passed under the name *obovata*; hence, there is no problem with its interpretation.

***Atriplex obovata* var. *tuberata* Macbride**, Contr. Gray Herb. 3: 11. 1918.
= *A. obovata* Moquin-Tandon
Type locality: Texas, El Paso Co., Fornillo Creek, Harberd 103.
Type: "No. 103 (see specimen of male). 1–2° [feet] high —Foliage & specially fruit different from that of A. acanthocarpa. Tornillo Creek. W. Texas. Aug. [18]83. V. Havard, U.S.A."; holotype GH!; isotype US!
The sheet at GH has two branches, one staminate and one with fruiting bracteoles. The bracteoles are rather strongly tuberculate, a feature not unusual within the species as a whole.

***Atriplex occidentalis* (Torrey & Frémont) Dietrich**, Syn. Pl. 5: 537. 1852.
Basionym: *Pterochiton occidentale* Torrey & Frémont
= *A. canescens* (Pursh) Nuttall

***Atriplex odontoptera* Rydberg**, Bull. Torrey Bot. Club 31: 404. 1904.
= *A. canescens* × *A. gardneri* var. *gardneri*
Type: Wyoming, Johnson Co., "3302. *Atriplex canescens* (Pursh) James. A. odontoptera Rydb. (Type) Buffalo. Elevation 4000–5000 feet. Frank Tweedy. September 1900"; holotype NY!; isotype RM!
This is a coarse specimen, very woody and obviously intermediate between *A. canescens* and *A. gardneri* var. *gardneri*

***Atriplex oppositifolia* S. Watson**, Proc. Amer. Acad. Arts 9: 118. 1874, non DC.
= *A. matamorensis* A. Nelson; *Obione oppositifolia* (S. Watson) Ulbrich, in Engler & Prantl
Type locality: "In the Rio Grande Valley on the Mexican side, collected only by Berlandier (No. 3201, 'Matamoras to San Fernando')" (Watson l.c.).
Type: "de Matamaras a San Fernando circa Guijano, Oct. 1830," and "Herbarium Berlandierianum Texano-Mexicanum. No. 3201. A. oppositifolia n. sp. S.W.! [initials are Sereno Watson's on sheet at GH]," Berlandier; holotype GH!; isotype NY!
The specimen at GH is doubly mounted with Palmer 1160, 1879. It is a portion of a herbaceous perennial with minute leaves ca 2–3 mm long and 1 mm wide. Bracteoles are conspicuously veined on the faces and prominently toothed lateral to the apical tooth.

***Atriplex orbicularis* S. Watson**, Proc. Amer. Acad. Arts 17: 377. 1882.
= *A. lentiformis* (Torrey) S. Watson (the *A. breweri* S. Watson phase)
Type locality: "At Santa Monica, California, on the seashore at the base of the bluffs; S. B. & W. F. Parish, October, 1881" (Watson 1882).
Type: "Flora of Southern California, S. B. & F. W. Parish, No. 1126, perennial, somewhat woody at base, 3–4 ft high, base of bluffs, sea shore, Sta Monica, Oct. 1881"; holotype GH!; isotypes DS!, NY!, US!
The fruiting bracts are ca 3 mm high and 4 mm wide. Leaves are elliptical and obtuse, tapering basally to a short petiole.

***Atriplex pabularis* A. Nelson**, Bull. Torrey Bot. Club 25: 203. 1898.
= *A. gardneri* var. *utahensis* (M. E. Jones) Dorn
Type locality: Wyoming, Sweetwater Co., Point of Rocks, A. Nelson 4429, Aug. 30, 1897.
Type: "A. Nelson 4429, Bitter Cr., Point of Rocks, 6500 ft, Sweetwater Co., Wyoming, 30 August 1897"; lectotype at RM! (Hall & Clements, Publ. Carnegie Inst. Wash. 326: 324. 1923); isolectotypes GH! (two sheets, male and female), NY!, US!

***Atriplex pabularis* var. *eremicola* (Osterhout) A. Nelson**, Coulter & Nelson, New Man. Bot. Rocky Mts. 168. 1909.
Basionym: *A. eremicola* Osterhout
= *A. gardneri* (Moquin-Tandon) Dietrich var. *gardneri*

***Atriplex parryi* S. Watson**, Proc. Amer. Acad. Arts 17: 378. 1882.
Type locality: "Near Colton [actually at Lancaster according to Parish in Zoe 5: 113. 1901], California; Dr. C. C. Parry 1881"; holotype (Parry 221) GH!; isotypes NY!, UC (frag.)!
The type consists of a branched stem, with lateral spinescent stems to 4 cm long. The leaves are ovate-orbicular. The plant is obviously allied to *A. confertifolia*, but distinct.

***Atriplex polycarpa* (Torrey) S. Watson**, Proc. Amer. Acad. Arts 9: 117. 1874.
Basionym: *Obione polycarpa* Torrey

Atriplex pringlei **Standley,** N. Amer. Flora 21: 68. 1916.
= *A. acanthocarpa* ssp. *pringlei* (Standley) Henrickson
Type locality: "Type collected on alkaline plains, Hacienda de Angostura, San Luis Potosi, Mexico, July 15, 1891, C. G. Pringle 3775 (U.S. Nat. Herb. no. 48298)."
Type: "Mexico, San Luis Potosi, alkaline plain, Hacienda de Angostura, 15 Jul 1891," C. G. Pringle 3775; holotype US!; isotype GH!

Atriplex sabulosa **M. E. Jones,** Contr. W. Bot. 11: 21. 1903. non *A. sabulosa* Rouy, 1890.
Basionym of: *A. jonesii* Standley
= *A. obovata* Moquin-Tandon
Type locality: Arizona, Navajo Co., "No. 4109 Jones, Winslow, Ariz., Sept., 1884, distributed as *A. Greggii*" (Jones 1903).
Type: "Flora of Arizona. 4109. Atriplex Greggii, Watson. Winslow, M. E. Jones, September 1, 1884"; holotype US!; isotypes GH!, NY!, POM!
The isotype at GH consists of three branches, two staminate and one pistillate.

Atriplex spinifera **Macbride,** Contr. Gray Herb. 53: 11. 1918.
Type locality: California, Kern Co., Maricopa Hills, May 15, 1913, Eastwood 3269 (Macbride 1918).
Type: "3269. Flora of California. Atriplex. Marcopa hills, Kern Co., Alice Eastwood May 15, 1913"; holotype GH!; isotype CAS!, US!
The holotype at GH consists of a branched stem bearing lateral spinescent branches to 4.2 cm long; that at US consists of spinose branchlets and two packets of fruiting bracteoles.

Atriplex spinosa **(Moquin-Tandon) D. Dietrich,** Syn. Pl. 5: 536. 1852.
Basionym: *Obione spinosa* Moquin-Tandon, in de Candolle
= *A. canescens* (Pursh) Nuttall

Atriplex stewartii **I. M. Johnston,** J. Arnold Arbor. 22: 110. 1941.
= *A. acanthocarpa* ssp. *stewartii* (I. M. Johnston) Henrickson
Type locality: Mexico.
Type: "Mexico: western Coahuila. Atriplex stewartii n. sp. Jour Arn. Arb. 22: 110. 1941. Eastern border of the Llano de Guaje, along road from Tanque del Aparejo 20 miles southeast of Tanque Armendais. Abundant on flats margining playa at base of Lomas del Aparego (3 miles south of Tangue Asparejo). Plant erect, 10–15 inches tall. I. M. Johnston, C. H. Muller No. 777. Aug. 28, 1940"; holotype GH!
The plant is obviously allied to *A. anthocarpa*, the variably 4-winged fruiting bracteoles having been derived independently or possibly through introgression from *A. canescens*. Henrickson (1988) does not suggest the latter possibility but does note that the 4-winged condition is not consistent, that there is a transition from that condition to those where the wings are replaced by radiating processes.

Atriplex subconferta **Rydberg,** Fl. Rocky Mts. 248. 1917 [1918].
= *A. confertifolia* (Torrey & Frémont) S. Watson
Type locality: Idaho, between Twin and Shoshone Falls, Nelson & Macbride 1379; holotype NY; isotypes POM, UC.
Type: "No. 1379. Atriplex confertifolia (Torr.) Wats. Dry bench lands, alt. 3700. Twin Falls and Shoshone Falls, 3700 ft., Idaho, July 27, 1911, Aven Nelson & J. F. Macbride"; holotype NY!; isotypes GH!, MO!, POM, RM!, UC, US!
This appears to be a small-leaved phase of *A. confertifolia* of little or no taxonomic significance.

Atriplex tetraptera **(Bentham) Rydberg,** Bull. Torrey Bot. Club 39: 311. 1912.
Basionym: *Obione tetraptera* Bentham
= *A. canescens* (Pursh) Nuttall

Atriplex torreyi **(S. Watson) S. Watson,** Proc. Amer. Acad. Arts 9: 119. 1874.
Basionym: *Obione torreyi* S. Watson

Atriplex torreyi **var.** *griffithsii* **(Standley) G. D. Brown,** Amer. Midl. Nat. 55: 205. 1956.
Basionym: *A. griffithsii* Standley
= *A. lentiformis* (Torrey) S. Watson

Atriplex tridentata **Kuntze,** Rev. Gen. Pl. 2: 546. 1891.
= *A. gardneri* var. *utahensis* (M. E. Jones) Dorn
Type locality: Utah, Box Elder Co., Corrine, Kuntze 3084, 1874.
Type: O. Kuntze 3084, "Bei Corinne am Salzsee, 7000 [much too high] ft. [Box Elder Co.], Utah, September 1874"; holotype NY!; isotype? K!
The specimen at K, labeled "Atriplex tridentata OKze n. sp. U.S. N. Am. zw. Cheyenne & Corinne. 7000′. Sept. 74. 3084. Herbarium Otto Kuntze," is perhaps best regarded as a paratype.

Atriplex watsonii **A. Nelson,** Proc. Biol. Soc. Wash. 17: 99. 1904. nom. nov. pro *A. decumbens.*
Basionym: *A. decumbens* S. Watson

Atriplex welshii **C. A. Hanson,** Stud. Syst. Bot. Brigham Young Univ. 1: 1. 1962.
= *A. gardneri* var. *welshii* (C. A. Hanson) Welsh
Type: "Utah: Grand Co., 4 mi south of Cisco along state highway 128, July 5, 1961"; C. A. Hanson 322; holotype BRY!; isotypes GH!, ISC!

Calligonum canescens **Pursh,** Fl. Amer. Sept. 2: 370. 1814.
= *A. canescens* (Pursh) Nuttall
Type locality: Lyman or Buffalo counties, South Dakota, M. Lewis in 1804.
Type: "Big Bend of the Missouri, Sept. 21, 1804," Lewis and Clark Herbarium; lectoype PH!, G. D. Brown, Amer. Midl. Naturalist 55: 209. 1956.
The original description of *Calligonum canescens* Pursh is "C. dioicum, pulverulento-fruticulosum; folis lanceolatis, floribus axillaribus glomeratis in apice ramulorum subspicatis, fructibus alatis, alis venosis cristato-dentatis. In the plains of the Missouri, near the Big bend. H. July, Aug. v.s. in Herb. Lewis. Flowers exceeding small. Goats delight to feed upon this shrub."
The sheet at PH contains three branches, the left one with immature fruit, the middle one sterile, and the one at right with mature fruiting bracteoles. This latter specimen was designated specifically as the lectotype by McNeill et al. (1983); it clearly fits the concept of the species as interpreted by contemporary authors, except for Stutz and Sanderson (1979), who claim that the type belongs to what was subsequently named *A. aptera* A. Nelson, based on the

assumption that the Lyman County, South Dakota, type locality is not within the current range of *A. canescens* as presently accepted but is within the range of *A. aptera*. Examination of a great many specimens from throughout the western plains has failed to yield a plant of *A. aptera* with fruiting bracteoles identical to the lectotype, which is matched many times among the specimens traditionally passing as *A. canescens*.

The type sheet bears the designation "Sept. 21, 1804," and the site of the Lewis and Clark camp on that date is adjacent to present Lower Brule, Lyman or Buffalo counties, a short distance above the confluence of the White River. That portion of the Missouri River has been inundated by waters behind the Fort Randall Dam, far downstream. Nuttall had traversed the river corridor in 1811, going upriver as far as Fort Mandan. The description and discussion by Nuttall (1818) of the species is pertinent to the interpretation of the Lewis type material. He describes the plant as about 3 or 4 feet high, with the "calix (i.e., fruiting bracteoles) 2-parted, becoming indurated, acute, with 4 unequal eristated or dentated angles"; the habitat was designated: "On the denudated saline hills of the Missouri [possibly a reference to the lower-growing, variable, *gardneri*-like *A. aptera*]; commencing about 15 miles below the confluence of the White River, and continuing to the mountains [i.e., to the Mandan, as near as he went toward the mountains]." Much of the habitat where plants typical of *A. canescens*, as traditionally interpreted, could have grown is beneath the waters of Fort Randall Dam, and a valid assumption that typical *A. canescens* did not occur there cannot be made. Some plants from areas of South Dakota adjacent to Lower Brule clearly approach typical *A. canescens*. There is no justification for interpretation of the name differently from that used in the historic past.

Obione acanthocarpa **Torrey,** U.S. & Mex. Bound. Bot. 2: 183. 1859.

= *A. acanthocarpa* (Torrey) S. Watson

Type locality: "Plains between the Burro mountains; September, *Bigelow*, (in fruit.) On the Rio Grande, below Presidio del Norte; *Parry*. Near the Piloncilla, Sonora, September"; *Thurber*. (No. 1739; *Wright*. His No. 1737 seems to be a slender form of the same.)

Type: "Rio Grande below Presidio del Norte (El Paso), Aug." Parry s.n.; lectotype NY! (Henrickson Southwest. Nat. 33: 454. 1988); isolectotype NY!

Obione berlandieri **(Moquin-Tandon) Moquin-Tandon,** in de Candolle, Prodr. 13(2): 114. 1849.

Basionym: *A. berlandieri* Moquin-Tandon

= *A. canescens* (Pursh) Nuttall

Obione canescens **(Pursh) Moquin-Tandon,** Chenop. Enum. 74. 1840.

Basionym: *Calligonum canescens* Pursh

= *A. canescens* (Pursh) Nuttall

Obione confertifolia **Torrey & Frémont,** in Frémont, Rep. Explor. Exped. Oregon & California 318. 1845.

= *Atriplex confertifolia* (Torrey & Frémont) S. Watson

Type locality: "On the borders of the Great Salt Lake" (l.c.).

Type: "Obione confertifolia, *Torr. & Frém.* in Frém. 2nd Reprt. (1845). Borders of the Great Salt Lake [near mouth of Weber River, Weber Co.], Utah. 761. 1843"; Frémont s.n. probably 10 September 1843; holotype NY!

This species is noted by Frémont (1845) in his journal entry for 10 September 1843, on his return trip from Disappointment [Frémont] Island. The plant was probably collected on the trip from the water's edge to the camp on the lower Weber River, in Weber Co., Utah. The holotype consists of a single branch in young fruit. The sheet bears the notation in Torrey's handwriting, "Obione rigida var. confertifolia n.sp. (crossed out) T. & F." Below the notation is a drawing of a fruiting bract, with one side folded back, and an ovary. This is clearly the specimen on which the species was based. There is a second sheet at NY!: "Frémont's 2nd Expedn." with the notation "Grayia or near it." The specimen has male inflorescence fragments and clearly is not a portion of the type collection.

Obione coriacea **(Forssk.) Moquin-Tandon,** Chenop. Enum. 71. 1840.

This Egyptian species was compared by Torrey and Frémont (Frémont 1845) with *Obione confertifolia* (see above). It does not occur in North America.

Obione gardneri **Moquin-Tandon,** in de Candolle, Prodr. 13(2): 114. 1849.

= *A. gardneri* (Moquin-Tandon) Dietrich var. *gardneri*

Type locality: SE Wyoming or W Nebraska, "Ad La Platte, Gardn. n. 250" (Moquin-Tandon in de Candolle l.c.).

Type: "Gordon 250. La Platte. Obione Gardneri Moq. A low female plant, lax spike in fruit," possibly 1843; holotype K?; isotype GH!

The fragments at GH consist of a leaf and two immature fruiting bracteoles, probably taken from the type at K (Hooker herbarium), which we have not seen. Writing on the fragment envelope is in ink, but partly illegible. The name of the collector is subject to interpretation, but is presumed to be "Gordon." Moquin-Tandon interpreted it as "Gardner," and named the species after the person assumed by him to be the collector. The epithet was spelled gardneri on purpose and is not an orthographic variant. It is legitimate under stipulations of the International Code.

Obione hymenelytra **Torrey,** in Whipple, Pacif. R. R. Rep. 4: 129. 1857.

= *Atriplex hymenelytra* (Torrey) S. Watson

Type locality: "Hills and gravelly places on the William's River [Bigelow]. This species was found by Dr. Parry and by Colonel Frémont on the Gila" (l.c.).

Type: "Frémont's Expedition to California, 1849. Obione hymenelytra, n. sp." (lectotype NY!, Brown, Amer. Midl. Nat. 55: 203. 1956.). "Frémont's Expedition to California, Gila" [1849] (presumed isolectotypes NY Crooke!, GH!). A third sheet, "Frémont's 2nd Expedition," is at NY! Except for the sheet designated as lectotype, the Frémont materials from 1849 are scanty, consisting mainly of fruiting bracts (presumed isolectotypes NY!, GH!) and a branchlet of equivocal source (GH!). The lectotype at NY bears all of the accoutrements of a Torrey type specimen, except for lack of illustrations, but includes a descriptive label in Torrey's handwriting and the name Obione hymenelytra, n. sp., on the label.

Obione lentiformis **Torrey,** in Sitgreaves Rep. 169. 1854.

= *Atriplex lentiformis* (Torrey) S. Watson

Type locality: California, along the Colorado River, S. W. Woodhouse s.n., 6 November 1851 (Sitgreaves Expedition, November 1851) (l.c.).

Type: "Sitgreaves Report 1851. Obione lentiformis Torr. in Sitgreaves ex Torrey. Rio Colorado, Calif.—Nev. ex Torrey"; "Rio Colorado. Nov. 6th 1851. Dr. Woodhouse"; lectotype NY! (selected by F. V. Coville, Contr. U.S. Natl. Herb. 4: 181. 1894); isolectotype GH!

***Obione lentiformis* β *rhombifolia* Torrey**, Pacific R. R. Rep. 4: 129. 1857.

Type: Arizona, NY?

I have been unable to locate material at NY with this designation nor make a determination as to its disposition taxonomically.

***Obione leucophylla* Moquin-Tandon**, in de Candolle, Prodr. 13(2): 109. 1849.

= *Atriplex leucophylla* (Moquin-Tandon) D. Dietrich

Type locality: "In California (Chamisso!), San-Francisco (Barclay!)" (l.c.).

Type: "San Francisco. Barclay"; holotype K!

***Obione obovata* (Moquin-Tandon) Ulbrich**, Natur. Pfl. ed. 2. 16(c): 508. 1934.

= *A. obovata* Moquin-Tandon

***Obione occidentalis* (Torrey & Frémont) Moquin-Tandon**, in de Candolle, Prodr. 13(2): 112. 1849.

Basionym: *Pterochiton occidentale* Torrey & Frémont

= *A. canescens* (Pursh) Nuttall

***Obione occidentale* var. *angustifolia* Torrey**, in Emory, Bot. Mex. Bound. 2(1): 189. 1848.

= *A. canescens* (Pursh) Nuttall

Type locality: Texas, Valley of the Rio Grande, Wright in 1852.

Type: "Field No. 394. Obione, Sandy ridge on Rio Grande, 3–5 ft tall, much branching, June 17, 1852. Rio Grande below El Paso Texas. [Wright] 1742 = 394"; holotype NY!; isotypes GH! (3 sheets).

All three sheets at GH bear the number 1742 on the label. One of them also has the number 394, which was evidently the field collection number. The number 1742 was subsequently applied. The specimens all have very narrow leaves to ca 4 mm wide and immature fruiting bracteoles. The sheet at GH with the number 394 is doubly mounted with a second Wright collection (1741 = No. 24), which has 4-winged fruiting bracteoles to 7 mm wide. Notes appear above both labels on the sheet. That above 24 reads: "24, Chenop. hills near Frontera, 3–4 ft tall, branching widely, July 19, 1851. *El Paso Co., Texas*"; above 324 is, "324. Obione, sandy ridges on Rio Grande, 3–5 feet tall, much branching, June 17, 1852, *Rio Grande below El Paso, Texas.*" The latter is an isotype. All of the specimens appear to be *A. canescens*, sens. lat.

Specimens with narrow leaves occur here and there throughout the range of the species. Those from western Texas that fit within the concept of var. *angustifolia* seem not to represent a taxon worthy of consideration.

***Obione oppositifolia* (S. Watson) Ulbrich**, in Engler & Prantl, Die Natur. Pflanzenf. Ed. 2. 16e: 508. 1934.

Basionym: *Atriplex oppositifolia* S. Watson

***Obione polycarpa* Torrey**, in Whipple, Pacific R. R. Rep. 4: 130. 1857.

= *A. polycarpa* (Torrey) S. Watson

Type: Arizona, Graham Co., "With the preceding," i.e., "Hills and gravelly places, on William's River valley of the Gila River [near base of Mt. Graham, ca 13 mi SW of Stafford]," October 28, 1846, Emory s.n.; holotype NY!

***Obione rigida* Torrey & Frémont**, in Frémont, Rep. Explor. Exped. Oregon & California 318. 1845 (nom. nud.).

= *Atriplex confertifolia* (Torrey & Frémont) S. Watson

Authentic specimen: "Obione rigida T. & F. On an island [Frémont Island] in Great Salt Lake, [Weber Co., Utah], Frémont 767, 1843"; Frémont s.n., 9 September 1843 (NY!, Torrey!).

The name was published without a description and is a nomen nudum. The specimen was taken on 9 September 1843 when Frémont and his boating party were on Disappointment [Frémont] Island in the Great Salt Lake. It seems clear from the notation that Torrey intended, at least initially, to name the species *O. rigida*, with the specimen taken later on "borders of the Great Salt Lake" as var. *confertifolia* of that species. Reasons for change of mind are not apparent, but Torrey abandoned the epithet *rigida* in favor of *confertifolia*. The application of the same number, in this case 767, to two sheets of the same taxon is in keeping with the practice of Frémont, at least occasionally, of using the number to indicate a species and not a collection. The sheet bears drawings of bracts, fruit, seed, and embryo, roughly sketched by Dr. Torrey.

***Obione spinosa* Moquin-Tandon**, in de Candolle, Prodr. 13(2): 108. 1849.

= *A. canescens* (Pursh) Nuttall

Type locality: "In Columbia (Nutt.!). Phyllocarpa spinosa Nutt.! in herb. Hook." (l.c.).

Type: "Lophocarya * *Pterocarya* (erossed out) * *spinosa*. R. Mts of the Columbia. Pt. canescens. Atriplex canescens?," Nuttall s.n.; holotype BM!

This name has consistently been treated as a synonym of *A. confertifolia*, but the Nuttall specimen at BM is *A. canescens*.

***Obione tetraptera* Bentham**, Bot. Voyage Sulph. 48. 1844.

= *A. canescens* (Pursh) Nuttall

Type locality: California, San Diego.

Type: "Ex Herbariae Musei Brittanniei Voyage of H.M.S. Sulphur, Capt. F. W. Beechey 1836–37, Capt. E. Beleher, 1837–41. (Type collection of Obione tetraptera Benth.) California, San Diego. Sept–Oct. 1839. Straggling shrub 7–9 ft. Hills San Diego. George W. Barclay 3060"; holotype BM!; isotypes GH!, K!, MO!

The isotypes at GH and K each consist of a large branch with few leaves and fruiting bracteoles still attached. The leaves are up to 4 mm wide and the bracts somewhat laciniate. Specimens approach the "*laciniata*" phase of *A. canescens* and possibly represent intergradation of *A. lincaris* with *A. canescens*. The specimen at K bears the label information, "Obione tetrptera. California. Barkley. Hooker 1844."

***Obione torreyi* S. Watson**, Rep. Geol. Explor. 40th Parallel 5: 290. 1871.

= *A. torreyi* (S. Watson) S. Watson

Type locality: Nevada, Humboldt Co., dry valleys bordering the Truckee and Carson rivers, Torrey 463 (Watson 1871).

Type: "Herbarium of Columbia College, New York, No. 463. Obione torreyi S. Wats. Sterile saline plains, Humboldt Co., Nevada. Collected by J. Torrey 1865"; lectotype GH! (G. D. Brown, Amer. Midl. Nat. 55: 205. 1956); isolectotype NY!

The holotype at GH is doubly mounted with Parry 280, 1881. It is staminate, with glomerules ca 2 mm thick arranged on short lateral spikes (to ca 1.5 cm long) on lateral branches of a much larger paniculate cluster to 28 cm long. Branches are longitudinally striate and ridged with low, acute ridges.

***Phyllocarpa spinosa* Nuttall ex Moquin-Tandon,** in de Candolle, Prodr. 13(2): 108. 1849. pro syn.

= *A. canescens* (Pursh) Nuttall

***Pterochiton canescens* (Pursh) Nuttall,** J. Acad. Nat. Sci. Philadelphia 1: 184. 1847.

Basionym: *Calligonum canescens* Pursh

= *A. canescens* (Pursh) Nuttall

***Pterochiton occidentale* Torrey & Frémont,** in Frémont, Rep. Explor. Exped. Oregon & California 318. 1845.

A. occidentalis (Torrey & Frémont) Dietrich; *A. canescens* var. *occidentalis* (Torrey & Frémont) Welsh & Stutz

= *Atriplex canescens* (Pursh) Nuttall var. *canescens*

Type locality: "The precise locality of this plant we cannot indicate, as the label was illegible; but it was probably from the borders of the Great Salt lake" (l.c.).

Type: "Pterochiton occidentale Torr. & Frém." Frémont, probably 10 September 1843 [locality data are missing from the type specimen] (holotype NY!; microfiche BRY!).

The herbarium sheet bears a folded sheet of paper with the usual careful and detailed drawings of bracts, embryo, and seed, and the designation "Pterochiton." In the lower right corner of the sheet is written "Frémont, N. Gen. Pterocalyx," and at the bottom center the words "Pterochiton occidentale, Torr. & Frém." The sheet contains three branches, with the bracts mainly fallen away. This sheet was designated as lectotype by G. D. Brown, Amer. Midl. Nat. 55: 209. 1956, but no other specimens are cited with the protologue and the designation should be holotype.

References

Brown, G. D. 1956. Taxonomy of American *Atriplex*. American Midland Naturalist 55: 199–210.

Davis, R. J. 1952. Flora of Idaho. W. M. C. Brown Company, Dubuque, IA.

Dietrich, N. F. D. 1852. Synopsis Plantarum. Sec. V. Vimariae: Frieder. Voigtii.

Hall, H. M., and F. E. Clements. 1923. The phylogenetic method in taxonomy. Publications of the Carnegie Institute, Washington 326: 1–355.

Hanson, C. A. 1962. New species of perennial *Atriplex* from the western United States. Studies in Systematic Botany, Brigham Young University 1: 1–4.

Henrickson, J. 1988. Revision of *Atriplex acanthocarpa* complex. Southwestern Naturalist 33: 451–463.

Jepson, W. L. 1914. Chenopodiaceae. Flora of California, 1(4): 428–448. Associated Students Store, University of California, Berkeley.

Johnston, I. M. 1941. New phanerogams from Mexico. IV. Journal of the Arnold Arboretum 22: 110–124.

_____. 1944. Plants of Coahuila, eastern Chihuahua, and adjoining Zacatecas and Durango. V. Journal of the Arnold Arboretum 25: 135–182.

Jones, M. E. 1903. Chenopodiaceae. Contributions to Western Botany 11: 18–22.

Kuntze, D. E. O. 1891. Revisio Genera Plantarum 1: 1–374.

Macbride, J. F. 1918. New or otherwise interesting plants, mostly North American Liliaceae and Chenopodiaceae. Contributions from the Gray Herbarium 3: 1–22.

McMinn, H. E. 1939. An illustrated manual of California shrubs. J. W. Stacey, Inc., San Francisco.

McNeill, J., I. J. Bassett, C. W. Crompton, and P. M. Taschereau. 1983. Taxonomic and nomenclatural notes on *Atriplex* L. (Chenopodiaceae). Taxon 34: 549–556.

Moquin-Tandon, A. 1840. Chenopodearum Monographica Enumerato. P. J. Loss, Paris.

_____. 1849. *Atriplex* L. *In:* A. P. de Candolle, Prodromus Systematis Naturalis Regni Vegetabilis 13(2): 90–115.

Nelson, A. 1898. New plants from Wyoming, I. Bulletin of the Torrey Botany Club 25: 202–206.

_____. 1902. Contributions from the Rocky Mountain Herbarium, IV. Botanical Gazette 34: 353–371.

_____. 1909. *Atriplex* L. *In:* J. Coulter and A. Nelson, New manual of botany of the central Rocky Mountains. American Book Company, New York.

Nuttall, T. 1818. The genera of North American plants 1: 1–312. D. Heartt, Philadelphia, PA.

_____. 1847. Plantes Gambler (?). Journal of the Academy of Natural Sciences, Philadelphia 1: 184.

Osterhout, G. 1898a. A new *Atriplex*. Bulletin of the Torrey Botany Club 25: 207.

_____. 1898b. A correction. Bulletin of the Torrey Botany Club 25: 284.

Pursh, F. T. 1814. Flora Americae Septentrionalis 2: 359–751. White, Cocchrane and Company, London.

Rydberg, P. A. 1904. Studies on the Rocky Mountain flora XI. Bulletin of the Torrey Botanical Club 31: 399–410.

_____. 1912. Studies on the Rocky Mountain flora XXVI. Bulletin of the Torrey Botanical Club 39: 99–113.

_____. 1917 [1918]. Flora of the Rocky Mountains and adjacent plains. Published by the author, New York.

_____. 1932. Flora of the prairies and plains of central North America. The New York Botanical Garden, New York.

Standley, P. C. 1916. Chenopodiales. North American Flora 21: 1–93.

_____. 1917. The Chenopodiaceae of the North American flora. Bulletin of the Torrey Botanical Club 44: 411–429.

_____. 1922. Trees and shrubs of Mexico. Contributions from the U.S. National Herbarium 23: 1–690.

Stutz, H. C. 1978. Explosive evolution of perennial *Atriplex* in western North America. Pages 161–168 *in* K. T. Harper and J. L. Reveal, editors, Intermountain biography: a symposium. Great Basin Naturalist Memoirs 2.

Stutz, H. C., and S. C. Sanderson. 1979. The role of polyploidy in the evolution of *Atriplex canescens*. *In:* J. R. Godin and D. K. Northington, editors, Arid plant resources. International Center for Arid and Semi-arid Land Studies, Lubbock, TX.

Torrey, J. C. 1848. Botany. *In:* W. Emory, Notes of a military reconnaissance from Fort Leavenworth, in Missouri, to San Diego, in California. U.S. Government Printing Office, Washington, DC.

_____. 1852. Appendix D, Botany. *In:* H. Stansbury, Exploration and survey of the valley of the Great

Salt Lake of Utah. Lippencott, Grambo & Co., Philadelphia.

_____. 1854. Botany. *In:* L. Sitgreaves, Report of an expedition down the Zuni and Colorado rivers. U.S. Government Printing Office, Washington, DC.

_____. 1857. Description of the general botanical collections. *In:* A. W. Whipple, Explorations and surveys to ascertain the practicable and economic route for a railroad from the Mississippi River to the Pacific Ocean (Pacific Railroad Report). A. O. P. Nicholson printer, Washington, DC.

_____. 1859. Botany of the boundary. Pages 30–259 *in* W. Emory, Report of the U.S. and Mexican boundary survey. Volume II. U.S. Department of the Interior, Washington, DC.

TORREY, J. C., AND J. C. FRÉMONT. 1845. Descriptions of some new genera and species of plants, collected in Captain J. C. Frémont's exploring expedition to Oregon and North California, in the years 1843–'44. Pages 311–319 *in* J. C. Frémont, A report of the exploring expedition to Oregon and North California, in the years 1843–'44. Senate Document 174, 28th Congress, 2nd Session. Blair & Rivers Printers, Washington, DC.

ULBRICH, E. 1934. Chenopodiaceae. *In:* A. Engler and K. Prantl, Die Naturlichen Pflanzenfamilien. Ed 2. 16c: 500–519.

WATSON, S. 1871. Botany. *In:* C. King, Report of geological exploration of the fortieth parallel 5: 1–525. U.S. Government Printing Office, Washington, DC.

_____. 1874. A revision of the North American Chenopodiaceae. Proceedings of the American Academy of Arts 9: 82–126.

_____. 1877. Descriptions of new species of plants, with revisions of certain genera. Proceedings of the American Academy of Arts 12: 246–278.

_____. 1882. Contributions to American botany. XVII. List of plants from southwestern Texas and northern Mexico, collected chiefly by Dr. E. Palmer in 1879–80. —Polypetalae. Proceedings of the American Academy of Arts 17: 316–378.

_____. 1891. *Atriplex* in articles. Botanical Gazette 16: 345–346.

WOOTEN, E. O., AND P. C. STANDLEY. 1913. Descriptions of new plants preliminary to a report on the flora of New Mexico. Contributions of the U.S. National Herbarium 16: 109–196.

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